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**PRELIMINARY ASSESSMENT/
VISUAL SITE INSPECTION**

**COMMONWEALTH EDISON COMPANY
BRAIDWOOD NUCLEAR POWER STATION
BRAIDWOOD, ILLINOIS
ILD 000 806 505**

FINAL REPORT

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Prepared for

**U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Waste Programs Enforcement
Washington, DC 20460**

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EXECUTIVE SUMMARY

ENFORCEMENT
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PRC Environmental Management, Inc. (PRC), performed a preliminary assessment and visual site inspection (PA/VSI) to identify and assess the existence and likelihood of releases from the solid waste management units (SWMU) and other areas of concern (AOC) at the Commonwealth Edison Company, Braidwood Nuclear Power Station (Braidwood) facility in Braidwood, Will County, Illinois. This summary highlights the results of the PA/VSI and the potential for releases of hazardous wastes or hazardous constituents from the SWMUs and AOCs identified.

The Braidwood facility is a full-steam electricity generation facility. Two water-pressurized nuclear fission reactors provide steam used to rotate turbines and the electricity generators coupled with them. Each of the reactors at Braidwood use the following three closed-loop cycles: (1) a primary cycle that provides heat to generate steam; (2) a secondary cycle that runs the turbines; and (3) a cooling cycle that cools steam exhausted by the secondary cycle, condensing the exhausted steam back to water, which is used again.

Hazardous wastes generated at the Braidwood facility include the following: mixed waste (F001), waste petroleum naphtha (D001, D018, and D039), waste monoethanolamine (D007, D008, D018, D021, D027, D039, and D040), spent chlorinated solvents (F002 and F003), spent nonchlorinated solvents (D001, D018, and D039), freon-contaminated oil and water (F002 and F003), and nonroutine wastes (various waste codes). The following nonhazardous wastes are generated at the facility: spent resins, spent charcoal, waste grease, spent mineral spirit, used oil, lime sludge, wastewater, and wastewater treatment plant (WWTP) sludge. According to facility representatives, mixed waste (F001), waste petroleum naphtha (D001, D018, and D039), and waste monoethanolamine (D007, D008, D018, D021, D027, D039, and D040) are no longer generated at the facility.

In October 1990, the facility filed a Part A permit application that listed the process code for a container storage (S01) unit with a capacity of 2,200 gallons. This process code referred to the facility's Mixed Waste Container Storage Area (CSA) (SWMU 1). According to the application, 85 gallons of mixed waste are stored at the facility. At the time of the VSI, the Braidwood facility had

not submitted a Part B permit application for SWMU 1 and was operating as an interim status treatment, storage, or disposal facility.

The PA/VSI identified the following 10 SWMUs at the facility:

1. Mixed Waste CSA
2. Hazardous Waste CSA
3. Used Oil Storage Pad
4. Used Oil Storage Tank
5. Hazardous Waste Satellite Accumulation Areas (SAA)
6. Indoor Oil Skimmer
7. Outdoor Oil Skimmers
8. WWTP
9. WWTP Sludge Pond
10. Lime Sludge Pond

No AOCs were identified during the PA/VSI.

The potential for release from all facility SWMUs to all environmental media is low. Mixed Waste CSA (SWMU 1) manages waste in closed containers that are kept inside secondary containers made of polyethylene. The secondary containers are surrounded by spill control booms and are stored on a concrete floor inside a building. The concrete floor is covered with polyacrylate terrazzo and has no drain. Hazardous Waste CSA (SWMU 2) manages hazardous and nonhazardous wastes in closed containers on a concrete pad inside a building. The concrete floor has a berm and no drains. Used Oil Storage Pad (SWMU 3) manages nonhazardous waste in closed containers outdoors on a bermed concrete pad. A drain in the concrete pad leads to the Outdoor Oil Skimmers (SWMU 7). Used Oil Storage Tank (SWMU 4) manages nonhazardous waste in an aboveground storage tank (AST). The AST is located inside a building and over a concrete floor and is surrounded by a berm. A drain in the concrete floor leads to the floor drain system. All the wastewater from this floor drain system is treated in SWMU 8. Hazardous Waste SAAs (SWMU 5) manage containers of hazardous waste stored inside metal cabinets. These cabinets have spill control pans and are located indoors on a concrete floor. A drain in the concrete floor leads to the floor drain system. All the wastewater from this floor drain system is treated in SWMU 8. Indoor Oil Skimmer (SWMU 6) manages nonhazardous waste in a 55-gallon drum stored inside a building that has a concrete floor. Outdoor Oil Skimmers (SWMU 7) manage nonhazardous waste in buried concrete tanks. WWTP (SWMU 8)

manages nonhazardous waste inside a building that has a concrete floor. WWTP and Lime Sludge Ponds (SWMUs 9 and 10, respectively) manage nonhazardous wastes in clay-lined, outdoor ponds. PRC found no documentation of hazardous constituent releases from any of the facility's SWMUs.

The Braidwood facility occupies 4,457 acres in a mixed residential and undeveloped area. The facility is bordered on the north by Mount Olivet Cemetery, the village of Godley, and a trailer park; on the east by agricultural lands; on the south by unused land; and on the west by Route 53. The southern and western boundaries of the Braidwood facility are also adjacent to the boundary lines between Will and Kankakee Counties, and between Will and Grundy Counties, respectively.

The facility's main cooling pond is the nearest surface water body to the facility. The pond occupies 2,537 acres, supplies cooling water to the facility, and is used for recreational purposes. The facility's makeup and drinking water intake is from the Kankakee River at a location about 3 miles east of the facility. The Kankakee and Mazon Rivers, located about 3 miles east and 1 mile southwest of the facility, respectively, receive discharges from the facility under an National Pollutant Discharge Elimination System permit issued by the Illinois Environmental Protection Agency.

Groundwater is not used as the primary source of drinking water in the facility area. However, the town of Braidwood, located about 1.5 miles north of the facility, obtains drinking water from a deep aquifer. There are also two private wells within 2 miles of the facility that draw water from a deep aquifer. A cement bentonite slurry trench hydraulically isolates the shallow aquifer at the site from the facility surroundings.

The nearest residences are located within 0.25 mile of the facility's northeastern corner. These residences are part of the village of Godley. The town of Braidwood is about 1.5 miles north of the facility. Residences in the village of Godley and the town of Braidwood are located about 0.5 to 2 miles from the nearest active structures at the facility. Facility access is tightly restricted and monitored by double fencing, surveillance cameras, security doors, and an on-site security staff. Wetland areas of Lacustrine, Palustrine, and Riverine systems are located on and near the facility property.

PRC recommends no further action for any facility SWMUs at this time.

1.0 INTRODUCTION

PRC Environmental Management, Inc. (PRC), received Work Assignment No. R05032 from the U.S. Environmental Protection Agency (EPA) under Contract No. 68-W9-0006 (TES 9) to conduct preliminary assessments (PA) and visual site inspections (VSI) of hazardous waste treatment and storage facilities in Region 5.

As part of the EPA Region 5 Environmental Priorities Initiative, the RCRA and CERCLA programs are working together to identify and address RCRA facilities that have a high priority for corrective action using applicable RCRA and CERCLA authorities. The PA/VSI is the first step in the process of prioritizing facilities for corrective action. Through the PA/VSI process, enough information is obtained to characterize a facility's actual or potential releases to the environment from solid waste management units (SWMU) and areas of concern (AOC).

A SWMU is defined as any discernible unit at a RCRA facility in which solid wastes have been placed and from which hazardous constituents might migrate, regardless of whether the unit was intended to manage solid or hazardous waste.

The SWMU definition includes the following:

- RCRA-regulated units, such as container storage areas, tanks, surface impoundments, waste piles, land treatment units, landfills, incinerators, and underground injection wells
- Closed and abandoned units
- Recycling units, wastewater treatment units, and other units that EPA has usually exempted from standards applicable to hazardous waste management units
- Areas contaminated by routine and systematic releases of wastes or hazardous constituents. Such areas might include a wood preservative drippage area, a loading or unloading area, or an area where solvent used to wash large parts has continually dripped onto soils.

An AOC is defined as any area where a release of hazardous waste or constituents to the environment has occurred or is suspected to have occurred on a nonroutine and nonsystematic basis. This includes any area where a strong possibility exists that such a release might occur in the future.

The purpose of the PA is as follows:

- Identify SWMUs and AOCs at the facility
- Obtain information on the operational history of the facility
- Obtain information on releases from any units at the facility
- Identify data gaps and other informational needs to be filled during the VSI

The PA generally includes review of all relevant documents and files located at state offices and at the EPA Region 5 office in Chicago.

The purpose of the VSI is as follows:

- Identify SWMUs and AOCs not discovered during the PA
- Identify releases not discovered during the PA
- Provide a specific description of the environmental setting
- Provide information on release pathways and the potential for releases to each medium
- Confirm information obtained during the PA regarding operations, SWMUs, AOCs, and releases

The VSI includes interviewing appropriate facility staff; inspecting the entire facility to identify all SWMUs and AOCs; photographing all visible SWMUs; identifying evidence of releases; making a preliminary selection of potential sampling parameters and locations, if needed; and obtaining additional information necessary to complete the PA/VSI report.

This report documents the results of a PA/VSI of the Commonwealth Edison Company (CECO), Braidwood Nuclear Power Station (Braidwood) facility (EPA Identification No. ILD 000 806 505)

located in Braidwood, Will County, Illinois. The PA was completed on January 17, 1994. PRC gathered and reviewed information from the Illinois Environmental Protection Agency (IEPA) and from EPA Region 5 RCRA files. The VSI was conducted on January 17, 1994. It included interviews with facility representatives and a walk-through inspection of the facility. PRC identified 10 SWMUs and no AOCs at the facility.

The VSI is summarized and 14 of 25 inspection photographs taken during the VSI are included in Appendix A. Most of the photographs have been renumbered; thus, their numbers differ from the photograph numbers in the VSI field notes, which are included in Appendix B.

2.0 FACILITY DESCRIPTION

This section describes the facility's location; past and present operations; waste generating processes and waste management practices; history of documented releases; regulatory history; environmental setting; and receptors.

2.1 FACILITY LOCATION

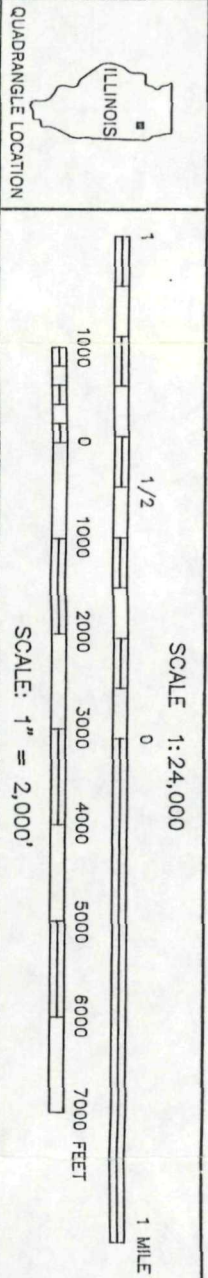
The Braidwood facility is located on Route 53 in Reed Township, Will County, Illinois. Figure 1 shows the location of the facility in relation to the surrounding topographic features [latitude 41°14'38" N and longitude 88°13'42" W (CECO, 1994)]. The Braidwood facility occupies approximately 4,457 acres in a mixed residential and undeveloped area. About 2,537 acres of the facility's property is occupied by the main cooling pond. Furthermore, approximately 6 square miles of area surrounding the facility is owned by CECO, the owner of Braidwood facility. This area is used for farming and land application of lime sludge and sewage sludge generated by the facility.

The Braidwood facility is bordered on the north by Mount Olivet Cemetery, the village of Godley, and a trailer park; on the east by agricultural lands; on the south by the unused land; and on the west by Route 53. The southern and western boundaries of the Braidwood facility are also adjacent to the boundary lines between Will and Kankakee Counties, and between Will and Grundy Counties, respectively.

2.2 FACILITY OPERATIONS

The Braidwood facility is a full-steam electricity generation facility. Two water-pressurized nuclear fission reactors provide steam used to rotate turbines and the electricity generators coupled with them. Each of the reactors at Braidwood use the following three closed-loop cycles: (1) a primary cycle that provides heat to generate steam; (2) a secondary cycle that runs the turbines; and (3) a cooling cycle that cools steam exhausted by the secondary cycle, condensing the exhausted steam back to water, which is used again. A schematic diagram showing the three cycles is presented in Figure 2.

SOURCE: MODIFIED FROM USGS, ESSEX, ILLINOIS, QUADRANGLE, 1980
AND WILMINGTON, ILLINOIS, QUADRANGLE, 1973

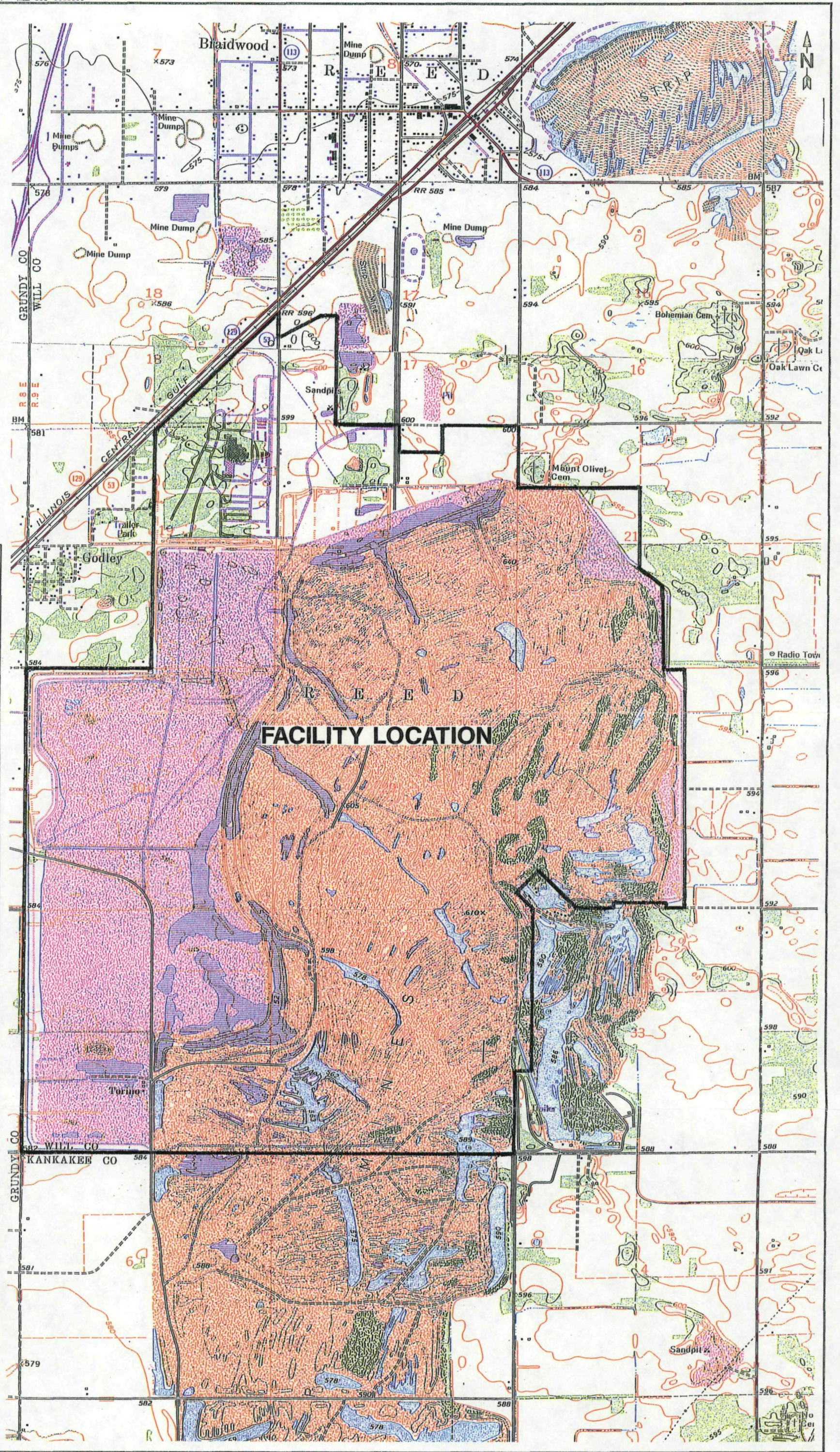


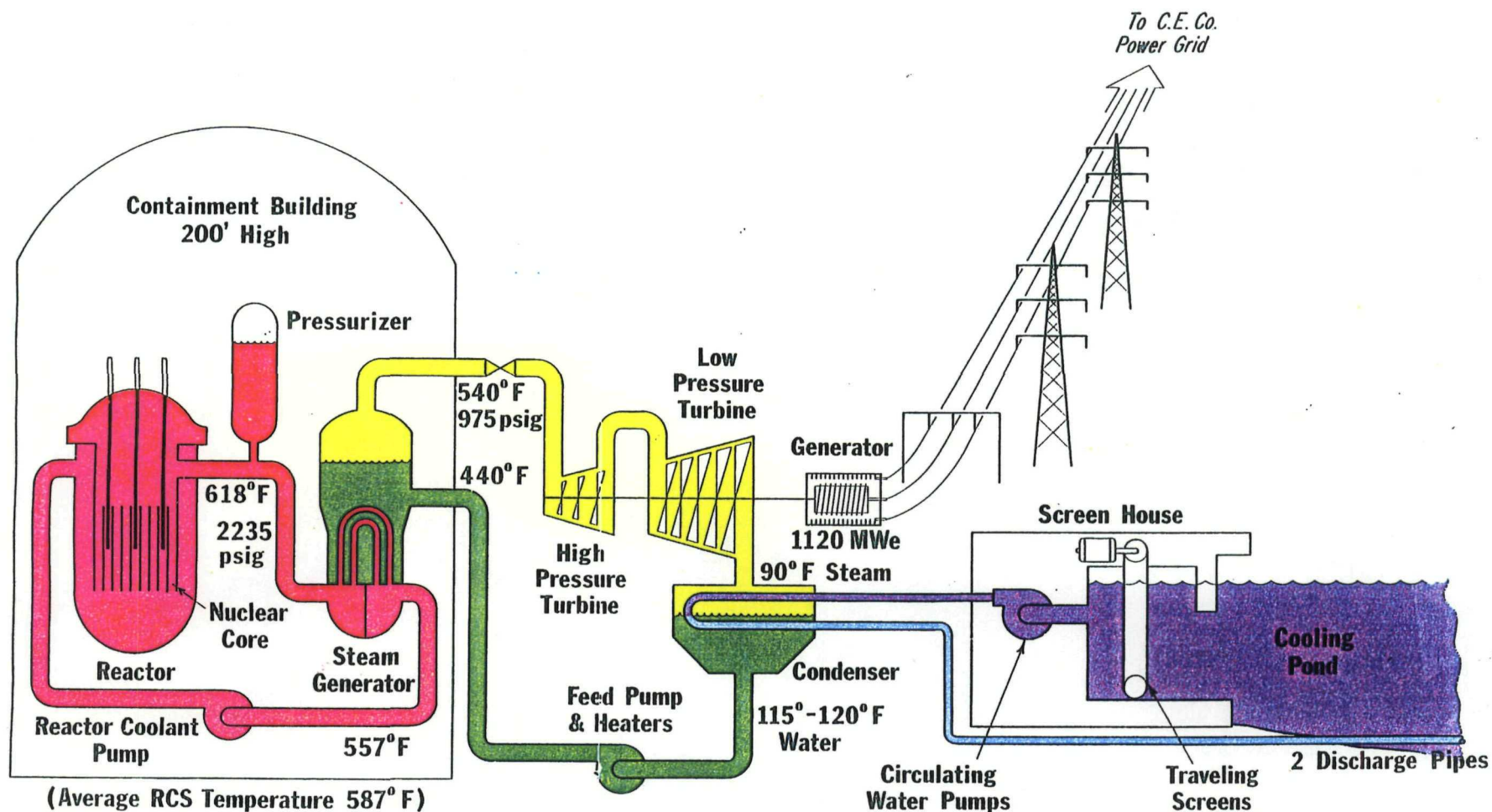
BRAIDWOOD NUCLEAR POWER STATION
BRAIDWOOD, ILLINOIS

FIGURE 1

FACILITY LOCATION

PERC ENVIRONMENTAL MANAGEMENT, INC.





- PRIMARY CYCLE (Reactor Grade Water)
- SECONDARY CYCLE (Non-Radioactive Steam)
- SECONDARY CYCLE (Non-Radioactive Feedwater)
- COOLING CYCLE (Non-Demineralized Water)

BRAIDWOOD NUCLEAR POWER STATION
BRAIDWOOD, ILLINOIS

FIGURE 2

PRESSURIZED WATER REACTOR DIAGRAM

PRC ENVIRONMENTAL MANAGEMENT, INC.

The primary cycle is used to transfer heat from the nuclear fission reactor to heat exchangers, or steam generators, where steam is made. Major components of the primary cycle include the reactor, a pressurizer, and four coolant loops. Each of these coolant loops contains a reactor coolant pump and a steam generator, which serve as the interface between the primary and the secondary cycles. The reactor coolant pump in each coolant loop circulates radioactive reactor coolant. The flow rate, pressure, and temperature of coolant in each loop is approximately 100,000 gallons per minute (gpm); 2,235 pounds per square inch, gauge (psig); and 587 °F; respectively. The coolant from each loop passes through the reactor and then through thousands of "U-tubes" inside its respective steam generator, where heat from the nuclear chain reaction is transferred to the nonradioactive secondary cycle. A pressurizer maintains pressure within the primary cycle to keep the reactor coolant from boiling and acts as a surge tank for routine expansion and contraction of the reactor coolant as it heats and cools (CECO No Date).

The secondary cycle transfers heat from the steam generators to the turbines for electricity production. Major components of the secondary cycle include the high-pressure and low-pressure turbines, the electricity generator, and the condenser. Ultra-pure, nonradioactive water is circulated through the "secondary side" of the steam generator, where it is boiled to make high-pressure steam (975 psig at 540 °F). The pressurized steam passes through the high-pressure and low-pressure turbines, where it expands and strikes the turbine blades, causing the turbine shaft to rotate. Turbine shaft rotates the electricity generator coupled with it, which generates electricity. Steam exhausted from the low-pressure turbine is discharged to the condenser, where it is cooled and converted back to water, which is recycled through the secondary cycle (CECO No Date).

The cooling cycle for the condenser is used to remove residual heat from the steam that is exhausted from the low pressure turbine, thereby allowing the steam to be condensed to water. Cooling water is drawn from the facility's main cooling pond. The main cooling pond cools water by about 20 °F in 4.5 days. The water used to make up for evaporation that occurs at the main cooling pond is obtained from the Kankakee River (CECO No Date). The facility's intake in the Kankakee River is located about 3 miles east of the Braidwood facility (CECO 1994).

The facility replaces spent reactor fuel every 18 months. Spent fuel is removed from the reactor and replaced with fresh fuel. During these refueling periods, or "outages," the spent fuel, which is highly

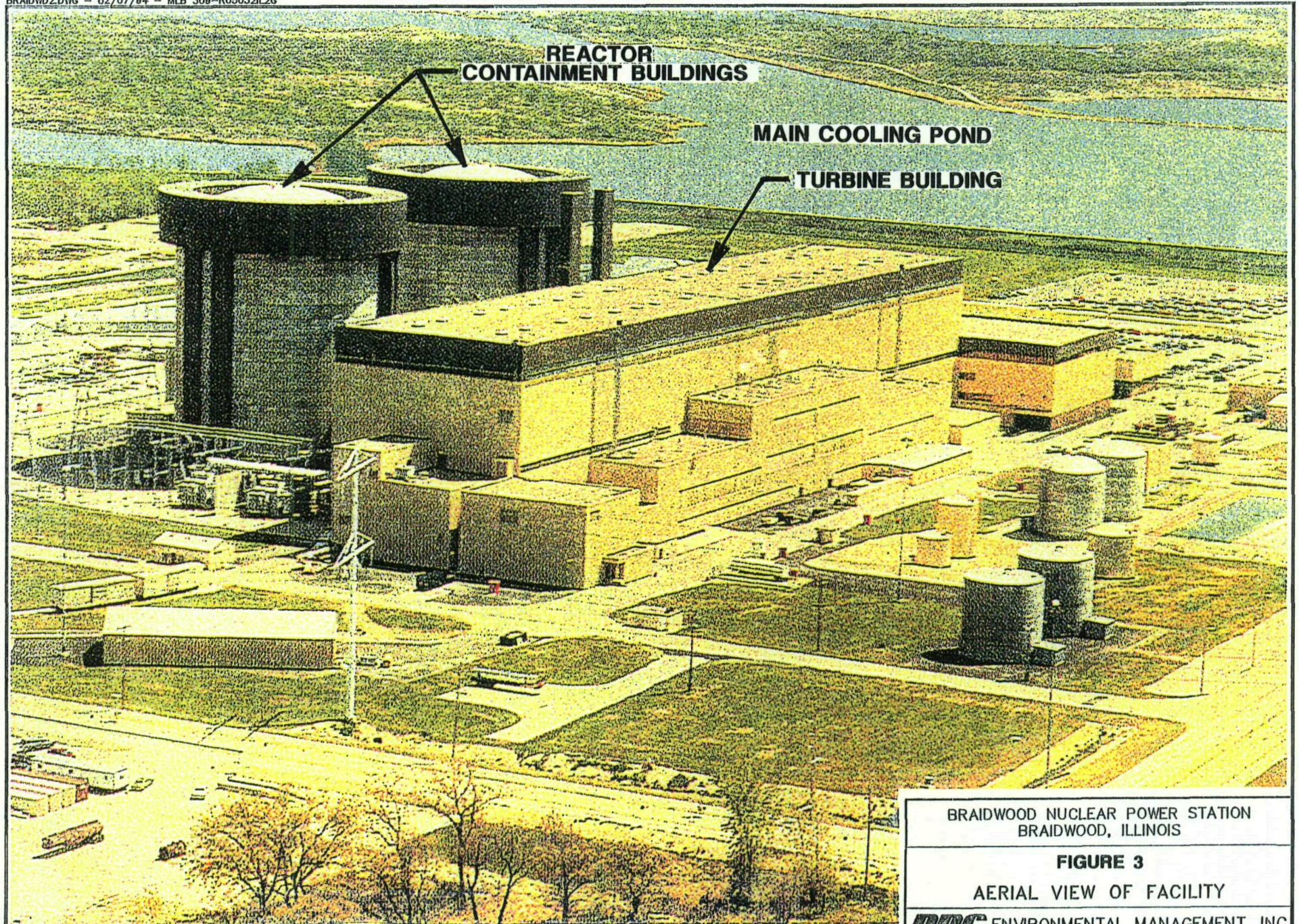
radioactive, is placed into the spent fuel storage pool located in the fuel handling building. The spent fuel storage pool is a 35.5-foot-deep pool of water that is constructed of reinforced concrete and lined with stainless steel. Spent fuel remains in the pool as the radioactive materials decay and give off heat (CECO No Date).

Construction of the Braidwood facility began in 1975. Commercial service at Units 1 and 2 began in July and October 1988, respectively. Before the facility was constructed, the general facility area was used for surface coal mining from approximately 1947 to 1974 (CECO No Date and 1994).

The facility's primary structures are the turbine building, the two reactor containment buildings, and the main cooling pond. The turbine building has four floors that are referred to by their elevation above mean sea level. The floors are referred to as Levels 569, 601, 626, and 651. The reactor containment buildings are 200-foot-tall, reinforced concrete, steel-lined cylinders that have an inside diameter of 140 feet. The buildings also extend to 60 feet below ground and are post-tensioned with steel tendons. The main cooling pond occupies 2,537 acres and is clay lined to reduce seepage (CECO No Date).

Additional structures at the facility include the fuel handling building, the auxiliary building, the access control building, a switchyard, a fire training area, the lime and the wastewater treatment plant (WWTP) sludge ponds, and the aboveground storage tanks (AST) used to store water and fuel oil. Underground storage tanks (UST) are discussed in Section 2.5. Figure 3 shows an aerial view of the Braidwood facility.

During normal operations, about 1,025 people (including Braidwood and its contractor's staff) work at the Braidwood facility. However, during outages, more people may be working on site because of additional contractor staff.



BRAIDWOOD NUCLEAR POWER STATION
BRAIDWOOD, ILLINOIS

FIGURE 3

AERIAL VIEW OF FACILITY

PRC ENVIRONMENTAL MANAGEMENT, INC.

2.3

WASTE GENERATION AND MANAGEMENT

This section describes waste generation and management at the Braidwood facility. The facility's SWMUs are identified in Table 1. The facility layout, including SWMUs, is shown in Figure 4. The facility's waste streams are summarized in Table 2. Unless otherwise noted, waste characterizations and generation rates, where available, were provided by facility representatives during the VSI. Facility representatives also stated that the Braidwood facility has implemented a waste minimization and inventory-control program since the facility began operations. This section does not discuss the generation of high-level and low-level radioactive wastes, which are not considered mixed wastes and are regulated by the Nuclear Regulatory Commission (NRC). Additionally, units that manage these radioactive wastes, such as the spent fuel storage pool and radioactive waste treatment systems, are not discussed.

In the following text, the phrases "water treatment" and "wastewater treatment" refer to specific facility operations. The phrase "water treatment" refers to the treatment of water that is used for steam generation during secondary cycle, and as potable water within the facility. The phrase "wastewater treatment" refers to the treatment of nonradioactive wastewaters excluding sewage.

Hazardous wastes generated at the Braidwood facility include the following: mixed waste (F001), waste petroleum naphtha (D001, D018, and D039), waste monoethanolamine (D007, D008, D018, D021, D027, D039, and D040), spent chlorinated solvents (F002 and F003), spent nonchlorinated solvents (D001, D018, and D039), freon-contaminated oil and water (F002 and F003), and nonroutine wastes (various waste codes). The facility generates the following nonhazardous wastes: spent resins, spent charcoal, waste grease, spent mineral spirit, used oil, lime sludge, wastewater, and wastewater treatment plant (WWTP) sludge. According to the facility representatives, mixed waste (F001), waste petroleum naphtha (D001, D018, and D039), and waste monoethanolamine (D007, D008, D018, D021, D027, D039, and D040) are no longer generated at the facility.

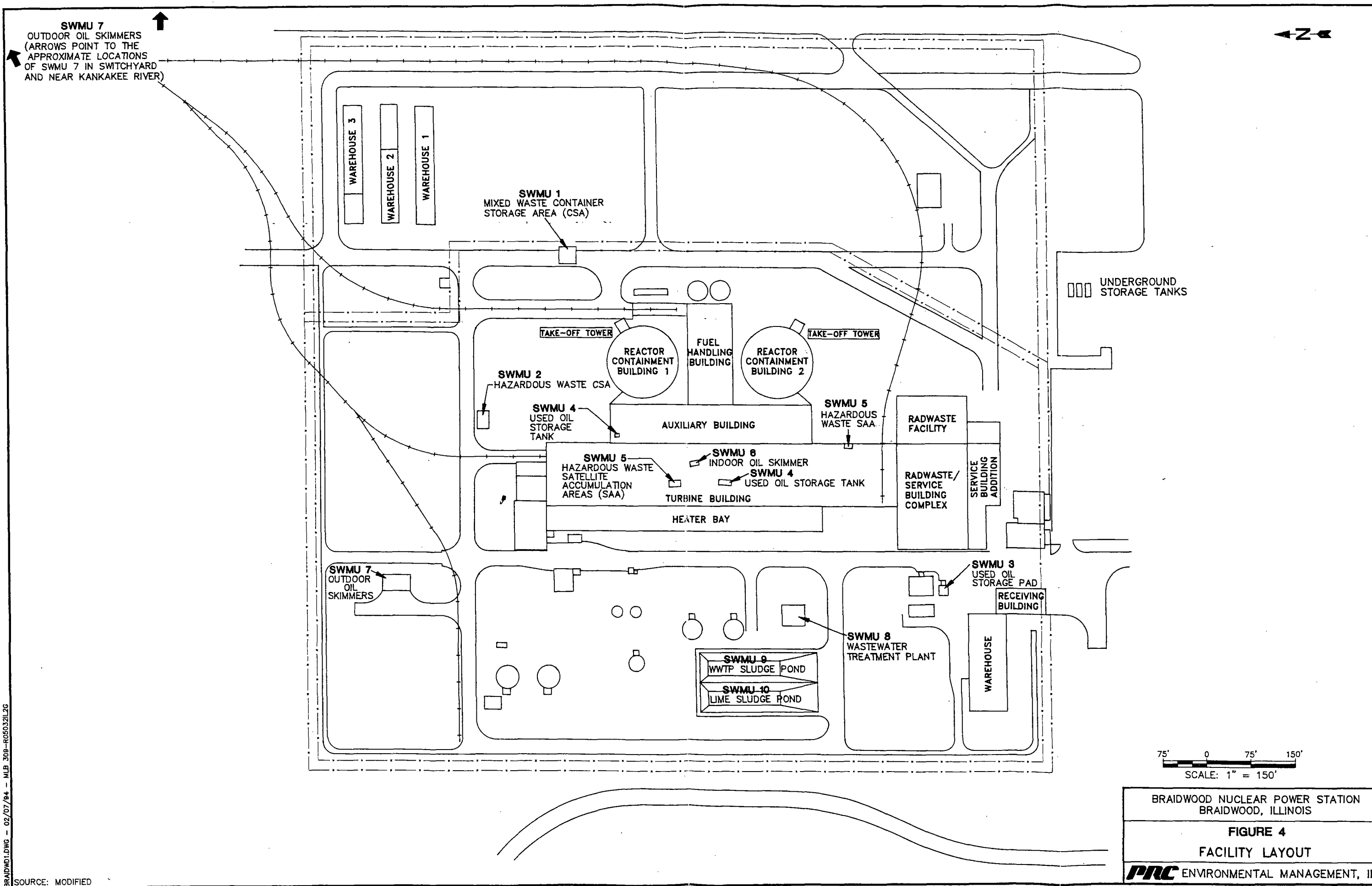
About 85 gallons of mixed, low-level radioactive and hazardous waste (F001) was generated when a parts cleaning machining was cleaned in the auxiliary building (CECO 1990). The parts cleaning machine was cleaned in mid-1990 and is stored in a warehouse at the facility (PRC 1994a). Because of the difficulties associated with shipping mixed waste to an appropriate off-site disposal facility, this

TABLE 1
SOLID WASTE MANAGEMENT UNITS

<u>SWMU Number</u>	<u>SWMU Name</u>	<u>RCRA Hazardous Waste Management Unit^a</u>	<u>Status</u>
1	Mixed Waste Container Storage Area (CSA)	Yes	Active; stores mixed waste for greater than 90 days
2	Hazardous Waste CSA	No	Active; stores hazardous waste for less than 90 days and stores nonhazardous waste
3	Used Oil Storage Pad	No	Active; stores nonhazardous waste
4	Used Oil Storage Tank	No	Active; stores nonhazardous waste
5	Hazardous Waste Satellite Accumulation Areas (SAA)	No	Active; accumulates hazardous waste
6	Indoor Oil Skimmer	No	Active; separates oil from wastewater
7	Outdoor Oil Skimmers	No	Active; separates oil from wastewater
8	Wastewater Treatment Plant (WWTP)	No	Active; treats wastewater
9	WWTP Sludge Pond	No	Active; stores sludge from WWTP
10	Lime Sludge Pond	No	Active; stores sludge from water treatment

Note:

^a A RCRA hazardous waste management unit is one that currently requires or formerly required submittal of a RCRA Part A or Part B permit application.



BRAIDWD1.DWG - 02/07/84 - MLB 309-R05032126

SOURCE: MODIFIED

BRAIDWOOD NUCLEAR POWER STATION
BRAIDWOOD, ILLINOIS

FIGURE 4
FACILITY LAYOUT

PRC ENVIRONMENTAL MANAGEMENT, INC.

TABLE 2
SOLID WASTES

<u>Waste/EPA Waste Code^a</u>	<u>Source</u>	<u>Solid Waste Management Unit^b</u>
Mixed waste/F001 ^c	Former parts cleaning equipment	1
Waste petroleum naphtha/D001, D018, and D039 ^c	Maintenance operations	None
Waste monoethanolamine/D007, D008, D018, D021, D027, D039, and D040 ^c	Maintenance operations	None
Spent chlorinated solvents/F002 and F003	Maintenance operations	2 and 5
Spent nonchlorinated solvents/D001, D018, and D039	Maintenance operations	2 and 5
Freon-contaminated oil and water/F002 and F003	Maintenance operations	2 and 5
Nonroutine wastes/various waste codes	Maintenance and laboratory operations and inventory control	2
Spent resins/NA	Water treatment	2
Spent charcoal/NA	Wastewater treatment	2
Waste grease/NA	Tendon maintenance	2
Spent mineral spirits/NA	Maintenance operations	None
Used oil/NA	Maintenance operations and oil skimming	3, 4, 6, 7, and 8
Lime sludge/NA	Water treatment	10
Wastewater treatment plant sludge/NA	Wastewater treatment	9
Wastewaters/NA	Facility operations	8

Notes: ^a Not applicable (NA) designates nonhazardous waste.
 ^b "None" indicates that the waste stream is not managed on site.
 ^c This waste is no longer generated at the facility.

waste remains on site in the Mixed Waste Container Storage Area (CSA) (SWMU 1). This waste has been stored for greater than 90 days.

Waste petroleum naphtha (D001, D018 and D039) was generated by parts washers located throughout the facility. The Braidwood facility has three parts washers that are used regularly. Additional parts washers are rented by the facility when needed, especially during outages. Until October 1993, the facility's part washers were serviced by the Safety-Kleen Corporation (SK) of Elgin, Illinois (EPA ID No. ILD 000 805 911). The parts washers are now serviced by Solvent System Corporation (SSC) of Elgin, Illinois (EPA ID No. ILD 984 832 006), and by Solar Environmental, Inc. (SEI), of Huntington, Indiana (EPA ID No. IND 984 899 740). Because SSC and SEI use nonhazardous mineral spirit in their parts washers, waste petroleum naphtha (D001, D018, and D039) is no longer generated at the facility. The facility generated 1,406 gallons of waste petroleum naphtha in 1993. Because this waste was shipped off site directly from the parts washers, it was not managed on site.

Waste monoethanolamine (D007, D008, D018, D021, D027, D039, and D040) was generated by parts washers that are located throughout the facility and were serviced by SK until October 1993. This waste is no longer generated at the facility because the facility's parts washers are now serviced by SSC and SEI, who use nonhazardous mineral spirit in their parts washers. The facility generated 130 gallons of waste monoethanolamine (D007, D008, D018, D021, D027, D039, and D040) in 1993. Because this waste was shipped off site directly from the parts washers, it was not managed on site.

Spent chlorinated solvents (F002 and F003) are generated during equipment cleaning and maintenance activities at the facility. This waste is accumulated in a 55-gallon drum at the Hazardous Waste SAAs (SWMU 5). When full, the drum is transferred to the Hazardous Waste CSA (SWMU 2) for less than 90-day storage. This waste is transported off site by SET Environmental, Inc. (SET), of Wheeling, Illinois (EPA ID No. ILD 981 957 236) to Treatment One of Houston, Texas (EPA ID No. TXD 055 135 388). Braidwood generated 110 gallons of this waste in 1993.

Spent nonchlorinated solvents (D001, D018, and D039) are generated during equipment cleaning and maintenance activities at the facility. This waste is accumulated in a 55-gallon drum at the Hazardous Waste SAAs (SWMU 5). This waste began to be generated in October 1993, and, by the time of the

VSI, the facility had not generated enough waste to fill the drum. Therefore, the generation rate for this waste is not known. According to facility representatives, when full, the drum will be transferred to the Hazardous Waste CSA (SWMU 2) for less than 90-day storage.

Freon-contaminated oil and water (F002 and F003) is generated during equipment maintenance. This waste is accumulated in a 55-gallon drum at the Hazardous Waste SAAs (SWMU 5). When full, the drum is transferred to the Hazardous Waste CSA (SWMU 2) for less than 90-day storage. SET transports this waste to Treatment One. The facility generated 165 gallons of this waste in 1993.

Nonroutine hazardous wastes with various waste codes are generated at the Braidwood facility during maintenance activities and chemical inventory control, which involves disposing of outdated products. These wastes are stored in 55-gallon drums or in containers of various sizes and types that are lab-packed. Both drummed wastes and lab-packed wastes are stored at the Hazardous Waste CSA (SWMU 2) for less than 90 days. SET transports these wastes off site to various facilities including Treatment One; Petrochem Processing (Petrochem) in Detroit, Michigan (EPA ID No. MID 980 615 298); and Bethelhum Apparatus Co. of Hellerton, Pennsylvania (EPA ID No. PAD 002 390 961). Because these wastes are nonroutine, the generation rates vary.

Spent resins (nonhazardous) are generated during water treatment at the facility. This waste is stored in metal containers at the Hazardous Waste CSA (SWMU 2) until shipped off site. SEI; Mr. Frank, Inc., of Illinois (EPA ID No. ILD 984 775 049) (Mr. Frank); and Clean Harbors Environmental Services of Massachusset (EPA ID No. MAD 039 322 250) transport this waste off site to Land & Lakes (L&L) landfill in Chicago, Illinois (IEPA ID No. 0316000034). The facility generated 64 cubic yards of this waste in 1993.

Spent charcoal (nonhazardous) is generated during wastewater treatment at the facility. This waste is stored in 55-gallon drums at the Hazardous Waste CSA (SWMU 2) until shipped off site. This waste is transported off site by one of the special waste transporters such as Mr. Frank to L&L landfill for disposal. The facility generated about 30 cubic yards of this waste in 1993.

Waste grease (nonhazardous) is generated during maintenance of tendons in the facility's reactor containment building. This waste is stored in 55-gallon drums at the Hazardous Waste CSA

(SWMU 2) until being shipped off site. SET transports this waste to Petrochem. The facility generated 275 gallons of this waste in 1993.

Spent mineral spirit (nonhazardous) is generated by parts washers located throughout the facility. The part washers are serviced by SSC and SEI, who ship this waste directly to Great Northern Processing (GNP) of Huntington, Indiana (EPA ID No. IND 984 900 209). Therefore, this waste is not managed on site. The facility generated 40 gallons of this waste in 1993.

Used oil (nonhazardous) is generated by equipment maintenance activities, by the facility's Indoor and Outdoor Oil Skimmers (SWMUs 6 and 7), and by the WWTP (SWMU 8). Used oil generated during equipment maintenance is stored in 55-gallon drums at the Used Oil Storage Pad (SWMU 3) or in the Used Oil Storage Tank (SWMU 4) until being shipped off site. Used oil generated by oil skimming at the Indoor Oil Skimmer (SWMU 6) is accumulated in a 55-gallon drum that is transferred to the Used Oil Storage Pad (SWMU 3) for storage until shipped off site. Used oil from the WWTP (SWMU 8) is stored in a 1,000-gallon AST at the WWTP (SWMU 8) until being shipped off site. Used oil generated by the Outdoor Oil Skimmers (SWMU 7) is transferred directly to an oil tanker used by SEI, who transports all used oil from the facility to GNP. The facility generated 1,193 gallons of used oil in 1993.

Lime sludge (nonhazardous) is generated during water treatment at the facility. This waste is accumulated in the 500,000-gallon Lime Sludge Pond (SWMU 10). Lime sludge from the pond is transported off site for land application at CECO's farms. Lime sludge is applied to the land under two IEPA land application permits discussed in Section 2.5. The generation rate of lime sludge is not monitored.

The WWTP sludge (nonhazardous) is generated during wastewater treatment at the WWTP (SWMU 8). This waste is accumulated in the 500,000-gallon WWTP Sludge Pond (SWMU 9). WWTP sludge has never been removed from the WWTP Sludge Pond (SWMU 9) for off site shipment because the facility has not yet accumulated enough of this waste to require its shipment off site.

The Braidwood facility also generates wastewaters that are managed by the WWTP (SWMU 8) and the Indoor Oil Skimmer (SWMU 6), and stormwater that is managed by the Outdoor Oil Skimmers (SWMU 7). Wastewaters managed by SWMUs 6 and 8 come from (1) floor drains located in the turbine building, (2) equipment drains, and (3) auxiliary boiler blowdown. These wastewaters and stormwater are not characterized prior to treatment; however, the discharge from SWMUs 7 and 8 is regulated under the facility's National Pollutant Discharge Elimination System (NPDES) permits discussed in Section 2.5.

2.4 HISTORY OF DOCUMENTED RELEASES

This section discusses the history of documented releases to groundwater and on-site soils at the Braidwood facility. The discussion below is based on information provided by Braidwood facility representatives during the VSI (CECO 1994). PRC did not note any additional releases to groundwater, surface water, air, or on-site soils during its review of EPA and IEPA files. Moreover, PRC found no documentation indicating that further action was required for the incidents discussed below.

Approximately 8,000 gallons of Diesel Fuel Oil No. 2 were released to on-site soil between approximately October 24, 1990, and December 19, 1990. The release occurred from a damaged diesel oil pipe located about 1 to 2 feet above a storm sewer that discharges to the Outdoor Oil Skimmers (SWMU 7) located in the northeastern quadrangle of the facility. About 7,750 gallons of the diesel fuel was recovered from SWMU 7 by January 12, 1991. About 275 cubic yards of soil contaminated by diesel fuel was excavated and disposed of at the L&L landfill in Chicago, Illinois. Groundwater at the Braidwood facility was monitored until December 1992 when groundwater contamination was detected to be below Class II groundwater standards. The facility reported this release, its associated cleanup activities, and the results of groundwater monitoring to IEPA (CECO 1991a, 1991b, and 1992).

2.5 REGULATORY HISTORY

In August 1980, the Braidwood facility filed a Notification of Hazardous Waste Activity form as a generator and treatment, storage, or disposal (TSD) facility and was assigned EPA Identification

Number ILD 000 806 505. The notification listed F001 and F002 waste codes (CECO 1980). In October 1982, the facility informed EPA that this notification was erroneously filed and that the facility will not be submitting a Part A permit application because it is not a TSD facility (CECO 1982).

However, in October 1990, the facility filed a Part A permit application that listed the process code for a container storage unit (S01) with a capacity of 2,200 gallons (CECO 1990). The S01 process code referred to the facility's Mixed Waste CSA (SWMU 1). At the time of the VSI, the Braidwood facility had not submitted a Part B permit application for SWMU 1 and was operating as an interim status TSD facility.

Limited information about RCRA compliance evaluation inspections (CEI) at the facility is available in EPA and IEPA files. During its review of these files, PRC found no documentation of outstanding RCRA CEI issues at the facility.

The Braidwood facility has three air permits, one NPDES permit, and three land application permits that are discussed below.

The facility has air permits for its radioactive waste volume reduction system, auxiliary boilers and various storage tanks, and for open burning of materials for firefighting training. The permit for the radioactive waste volume reduction system (Application No. 82110055; ID No. 197816AAB BRDWVRS) regulates the operation of a fluidized bed dryer and a fluidized bed dry waste incinerator. According to facility representatives, the fluidized bed dryer and incinerator have only been operated for a total of 2 weeks, on two different occasions, for testing with noncontaminated materials. The dryer and incinerator are not currently used because their operation is not cost-effective (PRC 1994a). This permit was reissued on February 21, 1992, and will expire on March 4, 1997 (IEPA 1992a). Fluidized bed dryer and dry waste incinerator are not considered a SWMU in this report because they manage only radioactive waste, which is regulated by NRC.

The air permit for the auxiliary boilers and storage tanks (Application No. 79020011; ID No. 197816AAB) regulates the operation of two Fuel Oil No. 2-fired auxiliary boilers; four diesel-fired generators; seven storage tanks used to store Fuel Oil No. 2, four storage tanks used to store turbine

oil, one storage tank used to store diesel fuel, and two storage tanks used to store gasoline; and one lime silo with a baghouse filter. This permit was issued on May 28, 1992, and will expire on September 7, 1994 (IEPA 1992b).

The air permit for open burning (Application No. B9307018; ID No. 197816) regulates open burning of 350 gallons of gasoline, 150 pounds of propane, 250 gallons of Distillate Oil No. 2, 350 pounds of wood and straw, and 100 pounds of paper per session of firefighting training. This permit was issued on October 18, 1993, and will expire on October 2, 1994 (IEPA 1993b).

PRC found no documentation of noise or odor complaints from area residents.

The Braidwood facility's IEPA NPDES permit (IL0048321) regulates the discharge of facility's effluent waters to the Kankakee and Mazon rivers. This permit was issued on January 29, 1991; and will expire on September 1, 1995 (IEPA 1991a). The facility's NPDES discharges to the Kankakee and Mazon Rivers are summarized below.

DISCHARGE NUMBER	DISCHARGE NAME	RECEIVING RIVER
001	Cooling Pond Blowdown Line	Kankakee
001(a)	WWTP Effluent	
001(b)	Sewage Treatment Plant Effluent	
001(c)	Radioactive Waste Treatment System Effluent	
001(d)	Demineralizer Regenerant Waste	
001(e)	Intake Screen Backwash	
002	North Site Stormwater Runoff Basin	Mazon
003	South Site Stormwater Runoff Basin	

According to the NPDES permit, the discharge from Cooling Pond Blowdown Line [Discharge No. (DN) 001] is to be monitored daily for temperature, once in a week for pH, and twice in a month for total residual chlorine. The discharge of WWTP Effluent [DN 001(a)], and from Radioactive Waste Treatment System Effluent [DN 001(c)] and North Site Stormwater Runoff Basin (DN 002) is to be

monitored weekly for total suspended solids (TSS) and oil and grease. The discharge of Sewage Treatment Plant Effluent [DN 001 (b)] is to be monitored weekly for TSS, biochemical oxygen demand for five days, and fecal coliform. The discharge from Demineralizer Regenerant Waste [DN 001(d)] is to be monitored weekly for TSS.

During its file review, PRC identified no documentation of outstanding NPDES compliance issues.

The land application permits regulate the disposal of sewage and lime sludge from the facility. Land Application Permit No. 1991-SC-4184 regulates the annual application of up to 8 dry tons of aerobically digested sewage sludge to 8 acres of land. This permit was renewed on December 13, 1991, and will expire on November 1, 1996 (IEPA 1991b). Farms used for land application under this permit are not considered a SWMU in this report because they are outside the facility boundaries.

Land Application Permit No. 1992-SC-1078 regulates the annual application of up to 1 dry ton of water treatment plant lime sludge to 64 acres of land. This permit was issued on August 14, 1992, and will expire on August 1, 1997 (IEPA 1992c). Farms used for land application under this permit are not considered a SWMU in this report because they are outside the facility boundaries.

Land Application Permit No. 1992-SC-1078-1 regulates the application of up to 4 tons of water treatment plant lime sludge per acre per year. This permit was issued on October 14, 1993, and will expire on August 1, 1997 (IEPA 1993a).

The Braidwood facility operates three 10,000-gallon, fiberglass-reinforced USTs. These USTs store diesel fuel, unleaded gasoline, and leaded gasoline. According to facility representatives, all three USTs passed the leak test conducted in 1993 and will be upgraded in 1998.

PRC found no documentation of CERLCA (Superfund) activities at the Braidwood facility.

2.6 ENVIRONMENTAL SETTING

This section describes the climate; flood plain and surface water; geology and soils; and groundwater in the vicinity of the facility.

2.6.1 Climate

The climate in Will County is typically continental with cold winters, warm summers, and frequent short periods of fluctuations in temperature, humidity, cloudiness, and wind direction. The average daily temperature is 50.9 °F. The lowest average daily temperature is 23.8 °F in January. The highest average daily temperature is 74.0 °F in July (Ruffner 1978).

The total annual precipitation for the Braidwood facility area is between 34 and 35 inches. The mean annual lake evaporation for the area is about 31 inches. The net annual precipitation is 28.4 inches. The 1-year, 24-hour maximum rainfall is 6.7 inches (Ruffner 1978).

The prevailing wind direction is from the west. Average wind speed is highest in March at 11.8 miles per hour. The average wind speed is 10.3 miles per hour from a westerly direction (Ruffner 1978).

2.6.2 Flood Plain and Surface Water

The Braidwood facility is not located within a 100-year flood plain (PRC 1994b). The nearest surface water body is the facility's main cooling pond (see Figure 3). This on-site pond occupies 2,537 acres and is used for supplying cooling water to the facility. The pond is also used for public recreation under the control of the Illinois Department of Conservation. The Kankakee River, located 3 miles east of the facility, receives treated wastewaters discharged from the facility and supplies makeup water to the facility. This river is also used as a drinking water supply for the town of Wilmington, located about 3 miles downstream and north of the facility's outfall locations. The Kankakee River also receives discharge from Horse Creek, which is located about 3 miles east of the facility. The Mazon River, located about 1 mile southwest of the facility, receives discharges from the facility's Outdoor Oil Skimmers (SWMU 7) and from Granary, Crane, Reddick Run, and East Fork Creeks,

which are located south of the facility. The Mazon River is used for recreational purposes and discharges to the Illinois River. In addition, there are several ponds near the facility (USGS 1980).

2.6.3 Geology and Soils

The Braidwood facility is located within the Kankakee Plain portion of the Till Plains section of the Central Lowlands Province. This section is characterized by widespread, variable deposits of glacial till, outwash, and lacustrine sediments assigned to the Wisconsinan, Illinoian, Kansan, and Nebraskan glacial deposits (CECO 1994).

The majority of the unconsolidated drift in the Braidwood area was deposited during the Wisconsinan Glaciation period of the Woodfordian Age. The Dolton Member of the Equality Formation serves as glacial veneer covering most of the Braidwood area. The Equality Formation averages approximately 45 feet thick in the local area and may be as much as 100 feet thick in some buried valleys. The Dolton Member mainly consists of sands with local beds of silt and gravel, most of which was deposited as beaches and bars. These sands are mainly medium grained and poorly sorted and contain a minor silt component. These sands eventually contain more silt where they grade with the Camri Member. Underlying these coarse grained deposits, where present, is the Wedron Formation of clay tills. Where the Wedron is not present, the underlying Pennsylvanian bedrock is exposed (PESI 1991).

Strip mining activities throughout the Braidwood area have exposed the Pennsylvanian System, which consists of coal formations and, more specifically, Cyclothem Sequences. The Cyclothems consist of alternating nonmarine and marine sequences (silt, sandstone, and limestone) deposited as the sea levels fluctuated during Pennsylvanian time (PESI 1991).

Surface soil types present in the Braidwood area are the Watseka loamy fine sand (Unit No. 49), the Bloomfield fine sand (Unit No. 53), the Plainfield sand (Unit No. 54), the Maumee fine sandy loam (Unit No. 89), the Ade loamy fine sand (Unit No. 98), the Pittwood fine sandy loam (Unit No. 130), and the Canisteo loam (Unit No. 347). The prime farmland soils of the Braidwood area include the Maumee fine sandy loam, the Pittwood fine sandy loam, and the Canisteo loam (CECO 1994).

2.6.4 Groundwater

The Braidwood area has two primary aquifer systems: the upper Pennsylvanian sandstone, limestone, and dolomite bedrock aquifers, and the deeper Ordovician limestone and dolomite bedrock aquifer. In addition, a shallow sand aquifer is present in the Braidwood facility area. The depth to the Pennsylvanian bedrock aquifer is about 44 feet, to the Cambro-Ordovician sequence is about 300 feet, and to the shallow sand aquifer is about 20 feet deep (PESI 1991).

Groundwater in the shallow aquifer occurs under water table conditions, which is recharged locally by precipitation. Groundwater from the shallow aquifer is discharged into local surface streams and strip mine pits, to the underlying bedrock, and to pumping wells. Well yields from this aquifer are in the range of 2 to 5 gpm, which is a rate suitable for domestic or farm use only.

The area surrounding the Braidwood facility recharges the shallow aquifer; therefore, the groundwater flows radially in all directions. Only two registered domestic wells are present within 1.5 miles of the facility and both wells obtained their water supply from the Pennsylvanian Sandstone aquifer. The town of Braidwood, approximately 1.5 miles north of the facility, uses groundwater as its water supply. CECO has an on-site industrial well located in the northern part of the facility. This well is currently not used (PESI 1991).

A cement-bentonite slurry trench has been installed around the Braidwood facility, through surface fill, the Parkland sand, and the Equality Formation. This trench is anchored 2 feet into the silty clay glacial till of the Wedron Formation, where present, otherwise it is set 2 feet into the bedrock. This cement bentonite slurry trench creates a subsurface hydraulic barrier to groundwater movement in the shallow aquifer (PESI 1991).

2.7 RECEPTORS

Braidwood facility's 2,537-acre main cooling pond is the nearest surface water body. This pond is used to supply cooling water to the facility. The pond is also used for recreational purposes. The facility obtains its drinking water and makeup water supply from the Kankakee River. Effluent from the facility's WWTP is discharged to the Kankakee river at a location about 3 miles east of the

facility. The town of Wilmington, located about 3 miles downstream and north of the facility, obtains its drinking water from the Kankakee River.

Groundwater in the shallow aquifer flows radially away from the site. However, the movement of groundwater from the facility area is restricted by a cement bentonite slurry surrounding the facility. Groundwater from the shallow aquifer is not used as drinking water supply in the immediate vicinity of the facility. The town of Braidwood, located about 1.5 miles north of the facility, uses groundwater as its primary source of drinking water.

The nearest residences are located within 0.25 mile of the northeastern corner of the facility, in the village of Godley. The town of Braidwood is about 1.5 miles north of the facility. However, the distances of these residences are more than 0.5 to 2 miles from the active structures of the facility (USGS 1980).

Facility access is tightly restricted. The main buildings are located within a "protected area" surrounded by a double-fenced, 35-foot isolation zone that is monitored by surveillance cameras. Access to areas within the protected area that contain equipment essential to safe plant operation is controlled by security doors. Security badges or key cards are used to grant access to various locations within the plant. Additionally, the responsibilities of an on-site security staff include the following: conducting routine patrols, controlling access of personnel and vehicles to the protected area, performing delivery and pick-up escort duties, monitoring security console activities, and responding to security alarms (CECO 1994).

Wetland areas of Lacustrine, Palustrine, and Riverine systems are located on and near the facility property. Lacustrine wetlands are of Limnetic subsystem and Unconsolidated Bottom (UB) class, and occupy areas smaller and greater than 2 acres. Palustrine wetlands are of UB, Emergent, and Forested classes and occupy areas smaller and greater than 2 acres. Riverine wetlands are of Lower Perennial subsystem and UB class and mostly occupy areas smaller than 2 acres (USDI 1981).

3.0 SOLID WASTE MANAGEMENT UNITS

This section describes the 10 SWMUs identified during the PA/VSI. The following information is presented for each SWMU: description of the unit, dates of operation, wastes managed, release controls, history of documented releases, and PRC's observations. Figure 4 shows the SWMU locations.

SWMU 1

Mixed Waste CSA

Unit Description:

This unit manages closed containers of waste in a concrete storage building that is located in the northwestern quadrangle of the facility. The storage building measures about 35 feet wide by 35 feet deep by 8.5 feet high. The building is steel framed and has reinforced concrete masonry walls, precast concrete roof panels, and an 8-inch-thick concrete floor that is covered with impervious polyacrylate terrazzo.

Date of Startup:

This unit began operation in October 1990.

Date of Closure:

This unit is currently active for greater than 90-day storage of mixed waste.

Wastes Managed:

This unit manages mixed waste (F001). According to facility representatives, mixed waste (F001) is no longer generated at the Braidwood facility. However, because of the difficulties associated with shipping mixed waste to an appropriate disposal facility, this waste remains on site and has been stored for greater than 90 days.

Release Controls:

Waste in two closed 55-gallon drums is stored in secondary containers of polyethylene. The secondary containers have (1) sliding, two-part cover to provide safe access to drums; (2) waterproof closure by having "over-snap" lids to prevent entry of rainwater; and

(3) translucent side walls to allow visual detection of a leak without removing the lids. The secondary containers are surrounded by absorbent booms and are stored in a concrete building that has no drain.

Observations:

PRC observed the area inside and outside the concrete building at this unit. Out of three secondary containers stored at the unit, only two had mixed waste (F001) in closed drums. According to facility representatives, one drum was full and the other was partially full. Total volume of mixed waste in both drums was about 85 gallons. No evidence of release was noted (see Photographs No. 1 and 2).

SWMU 2

Hazardous Waste CSA

Unit Description:

This unit manages closed containers of hazardous and nonhazardous wastes in a storage building that is located in northern part of the facility. The storage building measures about 50 feet wide by 30 feet deep by 10 feet high. The building is wood framed and has a concrete floor, a 6-inch-high concrete berm, and two entrances with ramps over the berm. Before the startup of this unit, hazardous waste was generated only because of inventory control and was not managed on site (PRC 1994c).

Date of Startup:

This unit began operation in August 1989.

Date of Closure:

This unit is currently active for less than 90-day storage of hazardous waste and for storage of nonhazardous waste.

Wastes Managed:

This unit manages hazardous and nonhazardous wastes. Hazardous wastes managed at this unit include spent chlorinated solvents (F002 and F003), spent nonchlorinated solvents (D001, D018, and D039), freon contaminated oil and water (F002 and F003), and nonroutine

wastes (various waste codes). Nonhazardous wastes managed at this unit include spent resins, spent charcoal, and waste grease.

Release Controls: Waste at this unit is managed in closed 55-gallon drums that are stored on a concrete floor with a berm and no drain. The unit has ramps over the berm. Absorbent material, spill control booms, and overpacks are present at the unit.

History of Documented Releases: No releases from this unit have been documented.

Observations: PRC observed the area inside and outside the building at this unit. At the time of VSI, one 55-gallon drum each of waste fryquel (nonhazardous), waste grease (nonhazardous), and spent charcoal (nonhazardous) was stored at this unit. No evidence of release was noted (see Photograph Nos. 3 and 4).

SWMU 3 Used Oil Storage Pad

Unit Description: This unit consists of an outdoor, uncovered, approximately 20-foot by 20-foot concrete area located southwest of the facility's turbine building. The concrete unit has a berm and a ramp over the berm at the entrance. A drain in the unit leads to one of the Outdoor Oil Skimmers (SWMU 7). This unit is surrounded by a 6-foot-high, chain-link fence and has a locked door.

Date of Startup: This unit began operation in February 1986.

Date of Closure: This unit is currently active.

Wastes Managed: This unit manages nonhazardous used oil in 55-gallon steel drums before off-site shipment.

Release Controls: Waste at this unit is managed in closed 55-gallon drums that are stored on a concrete floor with a berm. A drain in the floor leads to one of the Outdoor Oil Skimmers (SWMU 7) located in the northeastern quadrangle of the facility.

History of Documented Releases: No releases from this unit have been documented.

Observations: PRC observed that four drums of nonhazardous waste oil and several empty drums were stored in this unit. Much of the concrete pad and surrounding area was covered with snow. No evidence of release was noted (see Photograph No. 5).

SWMU 4 Used Oil Storage Tank

Unit Description: This unit is a 1,000-gallon, steel AST located at level 601 in approximately the middle of the turbine building. The AST is located over a concrete floor that has a concrete berm and a drain. The drain in the concrete floor leads to the floor drain system in the turbine building.

Date of Startup: This unit began operation in February 1986.

Date of Closure: This unit is currently active.

Wastes Managed: This unit manages nonhazardous used oil.

Release Controls: The 1,000-gallon, steel AST is located indoors on a bermed concrete floor. The drain in the concrete floor leads to the floor drain system in the turbine building. All the wastewater from this floor drain system is treated in the WWTP (SWMU 8).

History of
Documented Releases:

No releases from this unit have been documented.

Observations:

PRC observed the general area of this unit. No evidence of release was noted (see Photograph No. 6).

SWMU 5

Hazardous Waste SAAs

Unit Description:

This unit consists of four SAAs. Each SAA occupies an area of about 3 feet by 3 feet and is used to accumulate up to 55 gallons of hazardous waste in a steel drum. The drums are stored inside closed metal cabinets. The SAAs are located indoors on a concrete floor. The steel drums are closed when not receiving wastes. The metal cabinets are equipped with spill containment pans. At the time of the VSI, SAAs were located on level 601 of the turbine building. A metal cabinet at one of the SAAs stored spill control materials.

Date of Startup:

This unit began operation in August 1988.

Date of Closure:

This unit is currently active for accumulation of hazardous wastes.

Wastes Managed:

This unit manages spent chlorinated solvents (F002 and F003), spent nonchlorinated solvents (D001, D018, and D039), and freon-contaminated oil and water (F003 and F003).

Release Controls:

Waste at this unit is managed in closed 55-gallon drums that are stored in closed metal cabinets which are equipped with spill containment pans. One of the metal cabinets stores spill control material. Floor drains in the area of this unit lead to the floor drain system in the turbine building.

History of
Documented Releases:

No releases from this unit have been documented.

Observations: PRC observed the area of SAAs. No evidence of release was noted (see Photograph Nos. 7 and 8).

SWMU 6 **Indoor Oil Skimmer**

Unit Description: This unit has an oil and water separator located at level 569 near the center of the turbine building. The unit is mounted on a metal frame about 5-feet-tall and located on a concrete floor. The unit uses a tygon tube to separate oil and wastewater from the floor drain system in the turbine building. Separated oil is accumulated in a 55-gallon steel drum.

Date of Startup: This unit began operation in February 1986.

Date of Closure: This unit is currently active.

Wastes Managed: This unit manages wastewater and nonhazardous used oil from the floor drain system in the turbine building.

Release Controls: Waste is accumulated in a 55-gallon drum stored on a concrete floor. When full, the drum is transferred to the Used Oil Storage Pad (SWMU 3). The drains in the concrete floor lead to the WWTP (SWMU 8).

History of Documented Releases: No releases from this unit have been documented.

Observations: PRC observed the general area of this unit. At the time of VSI, there were two oil and water separators at this unit. According to facility representatives, the older oil and water separator was being replaced with the new one. No evidence of release was noted (see Photograph No. 9).

SWMU 7**Outdoor Oil Skimmers****Unit Description:**

This unit consists of three concrete oil and water separators: one located near the northwest side of the turbine building, one in the switchyard northeast of the facility, and one near the water intake from the Kankakee River. All three oil and water separators are buried below grade and have an oil accumulation chamber and a pump for pumping oil to tankers used to ship the oil off site. The outside dimension of the oil and water separator located near the northwest side of the turbine building are approximately 59 feet by 31.5 feet by 12 feet. The outside dimensions of the other two oil and water separators are approximately 19 feet by 12 feet by 12 feet.

Date of Startup:

This unit began operation in early 1983.

Date of Closure:

This unit is currently active.

Wastes Managed:

This unit manages stormwater and nonhazardous used oil.

Release Controls:

This unit is located below grade and is constructed of concrete. The level of oil accumulated within the oil accumulation chamber is measured monthly. Oil is transported off site when its depth in the oil accumulation chamber reaches 6 inches. The unit has no other form of release controls.

**History of
Documented Releases:**

No releases from this unit have been documented.

Observations:

PRC observed the aboveground portions of this unit, which were covered with snow. No evidence of release was noted (see Photograph No. 10).

SWMU 8**WWTP****Unit Description:**

This unit is located indoors in a dedicated building in the southeastern quadrangle of the facility. Major components of this unit include: a concrete, flow equalization tank; an oil and water separator; a used oil accumulation AST; a quadricell for flocculation; two charcoal filters; and an effluent storage tank. Sludge generated during wastewater treatment at this unit is managed in the WWTP Sludge Pond (SWMU 9).

Date of Startup:

This unit began operation in August 1985.

Date of Closure:

This unit is currently active.

Wastes Managed:

This unit manages wastewaters from equipment and floor drains in the turbine building. These wastewaters are not characterized prior to treatment; however, the discharge from this unit (SWMU 8) is regulated under the facility's NPDES permit (see Section 2.5).

Release Controls:

The components of this unit are located indoors on a concrete floor.

**History of
Documented Releases:**

No releases from this unit have been documented.

Observations:

PRC observed the various components of this unit and noted that the interior of the building housing this unit was extremely clean. No evidence of release was noted (see Photographs No. 11 and 12).

SWMU 9**WWTP Sludge Pond****Unit Description:**

This unit is an approximately 35 feet long, 175 feet wide, and 7 feet deep, clay-lined, 500,000-gallon pond. The pond is located west of

the turbine building and adjacent to the Lime Sludge Pond (SWMU 10).

Date of Startup: This unit began operation in August 1985.

Date of Closure: This unit is currently active.

Wastes Managed: This unit manages nonhazardous sludge from the WWTP (SWMU 8).

Release Controls: Waste is stored in a clay-lined pond. No other form of release controls are present.

History of Documented Releases: No releases from this unit have been documented.

Observations: PRC observed the pond and its surrounding area. Most of the pond was frozen and covered with snow. No evidence of release was noted (see Photograph No. 13).

SWMU 10

Lime Sludge Pond

Unit Description: This unit is an approximately 35 feet long, 175 feet wide, and 7 feet deep, clay-lined, 500,000-gallon pond. The pond is located west of the turbine building and the WWTP Sludge Pond (SWMU 9).

Date of Startup: This unit began operation in mid 1983.

Date of Closure: This unit is currently active.

Wastes Managed: This unit manages nonhazardous lime sludge generated during water treatment at the facility.

Release Controls:

Waste is stored in a clay-lined pond. No other form of release controls is present.

**History of
Documented Releases:**

No releases from this unit have been documented.

Observations:

PRC observed the pond and its surrounding area. Most of the pond was frozen and covered with snow. No evidence of release was noted (see Photograph No. 14).

4.0 AREAS OF CONCERN

PRC identified no AOCs during the PA/VSI.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The PA/VSI identified 10 SWMUs and no AOCs at the Braidwood facility. Background information on the facility's location; operations; waste generating processes and waste management practices; history of documented releases; regulatory history; environmental setting; and receptors is presented in Section 2.0. SWMU-specific information, such as the unit's description, dates of operation, wastes managed, release controls, history of documented releases, and observed condition, is presented in Section 3.0. Following are PRC's conclusions and recommendations for each SWMU. Table 3, located at the end of this section, summarizes the SWMUs at the facility and the recommended further actions.

SWMU 1 Mixed Waste CSA

Conclusions: This unit manages mixed waste in closed 55-gallon drums that are inside polyethylene secondary containers. The secondary containers are surrounded by spill control booms and are stored inside a concrete building that has no drain. The building itself is located outdoors. No releases from this unit have been documented. The potential for release to all environmental media is low.

Recommendations: PRC recommends no further action at this time.

SWMU 2 Hazardous Waste CSA

Conclusions: This unit manages closed containers of hazardous and nonhazardous wastes inside a storage building. The building is located outdoors, has a concrete floor, a 6-inch-high concrete berm, a ramp over the berm at the building entrances, and no drain. No releases from this unit have been documented. The potential for release to all environmental media is low.

Recommendations: PRC recommends no further action at this time.

SWMU 3**Used Oil Storage Pad****Conclusions:**

This outdoor unit manages closed containers of nonhazardous used oil on a concrete pad. The pad is surrounded by a concrete berm. The drain in the floor leads to one of the Outdoor Oil Skimmers (SWMU 7) located in the northeast quadrangle of the facility. No releases from this unit have been documented. The potential for release to all environmental media is low.

Recommendations:

PRC recommends no further action at this time.

SWMU 4**Used Oil Storage Tank****Conclusions:**

This indoor unit manages nonhazardous used oil. The unit has a concrete floor, a concrete berm, and a drain that leads to the floor drain system in the turbine building. Wastewater from this floor drain system is treated in WWTP (SWMU 8). No releases from this unit have been documented. The potential for release to all environmental media is low.

Recommendations:

PRC recommends no further action at this time.

SWMU 5**Hazardous Waste SAAs****Conclusions:**

Each SAA constituting this unit accumulates up to 55-gallons of hazardous wastes in closed containers located indoors on a concrete floor. Containers of waste are stored inside closed, metal cabinets that have a spill collection pan. No releases from this unit have been documented. The potential for release to all environmental media is low.

Recommendations:

PRC recommends no further action at this time.

SWMU 6**Indoor Oil Skimmer****Conclusions:**

This indoor unit manages nonhazardous used oil in a 55-gallon drum. The drum is located on a concrete floor and is transferred to the Used Oil Storage Pad (SWMU 3) when full. No releases from this unit have been documented. The potential for release to all environmental media is low.

Recommendations:

PRC recommends no further action at this time.

SWMU 7**Outdoor Oil Skimmers****Conclusions:**

The Outdoor Oil Skimmers are located below grade and are constructed of concrete. This unit manages stormwater runoff. Discharge from the unit is regulated under an NPDES permit; no outstanding NPDES compliance issues were identified during the PA/VSI. No releases from this unit have been documented. The potential for release to all environmental media is low.

Recommendations:

PRC recommends no further action at this time.

SWMU 8**WWTP****Conclusions:**

All elements comprising this unit are located indoors on a concrete floor. The unit discharges effluent to the Kankakee and Mazon Rivers under an NPDES permit; no outstanding NPDES compliance issues were identified during the PA/VSI. No releases from this unit have been documented. The potential for release to all environmental media is low.

Recommendations:

PRC recommends no further action at this time.

SWMU 9 WWTP Sludge Pond

Conclusions: This unit manages nonhazardous sludge generated by the WWTP (SWMU 8). These wastes are managed in an outdoor, clay-lined pond. No releases from this unit have been documented. The potential for release to all environmental media is low.

Recommendations: PRC recommends no further action at this time.

SWMU 10 Lime Sludge Pond

Conclusions: This unit manages nonhazardous lime sludge generated during water treatment at the facility. This waste is managed in an outdoor, clay-lined pond. No releases from this unit have been documented. The potential for release to all environmental media is low.

Recommendations: PRC recommends no further action at this time.

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TABLE 3
SWMU SUMMARY

<u>SWMU</u>	<u>Dates of Operation</u>	<u>Evidence of Release</u>	<u>Recommended Further Action</u>
1. Mixed Waste CSA	October 1990 to present	None	No further action
2. Hazardous Waste CSA	August 1989 to present	None	No further action
3. Used Oil Storage Pad	February 1986 to present	None	No further action
4. Used Oil Storage Tank	February 1986 to present	None	No further action
5. Hazardous Waste SAAs	August 1988 to present	None	No further action
6. Indoor Oil Skimmer	February 1986 to present	None	No further action
7. Outdoor Oil Skimmers	Early 1983 to present	None	No further action
8. WWTP	August 1985 to present	None	No further action
9. WWTP Sludge Pond	August 1985 to present	None	No further action
10. Lime Sludge Pond	Mid 1983 to present	None	No further action

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APPENDIX A
VISUAL SITE INSPECTION SUMMARY AND PHOTOGRAPHS
(12 Pages)



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COMM EDISON CO BRAIDWOOD NUCLEAR PWR STA

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VISUAL SITE INSPECTION SUMMARY

**COMMONWEALTH EDISON COMPANY
BRAIDWOOD NUCLEAR POWER STATION
BRAIDWOOD, ILLINOIS 60407
ILD 000 806 505**

Date: January 17, 1994

Primary Facility Representatives: Joseph Tidmore, System Test Engineer
Patricia Boyle, Hazardous Materials Coordinator

Representative Telephone No.: (815) 458-2801

Additional Facility Representatives: David J. Miller, Technical Services Superintendent
Dough Yowell, Principal Biologist, Environmental Services
Louis E. Magers, Environmental Engineer, Environmental Services

Inspection Team: Manoj Mishra, PRC Environmental Management, Inc. (PRC)
Cathy Collins, PRC

Photographer: Manoj Mishra, PRC

Weather Conditions: Sunny, snow cover, about 5°F

Summary of Activities: The PRC inspection team arrived at the facility at 10:25 a.m. The visual site inspection (VSI) began at 10:45 a.m. with an introductory meeting. The inspection team explained the purpose of the VSI and the agenda for the visit. Facility representatives then discussed the facility's past and current operations, solid wastes generated, and release history. Facility representatives provided the inspection team with copies of requested documents.

The VSI tour began at 2:10 p.m. At the time of the VSI, the facility was in full operation. During the tour, PRC viewed waste generation areas and the following solid waste management units (SWMU): the Mixed Waste Container Storage Area (CSA) (SWMU 1), the Hazardous Waste CSA (SWMU 2), the Used Oil Storage Pad (SWMU 3), the Used Oil Storage Tank (SWMU 4), the Hazardous Waste Satellite Accumulation Areas (SAA) (SWMU 5), the Indoor Oil Skimmer (SWMU 6), the Wastewater Treatment Plant (WWTP) (SWMU 8), the WWTP Sludge Pond (SWMU 9), and the Lime Sludge Pond (SWMU 10). PRC also viewed the area above one of the Outdoor Oil Skimmers (SWMU 7) and the farm lands where lime sludge is applied.

The tour concluded at 3:45 p.m., after which the inspection team held an exit meeting with facility representatives. The VSI was completed and the inspection team left the facility at 4:15 p.m.



Photograph No. 1

Orientation: North

Location: SWMU 1

Date: January 17, 1994

Description: This photograph shows mixed waste drums in secondary containers. Secondary container on the left is empty.



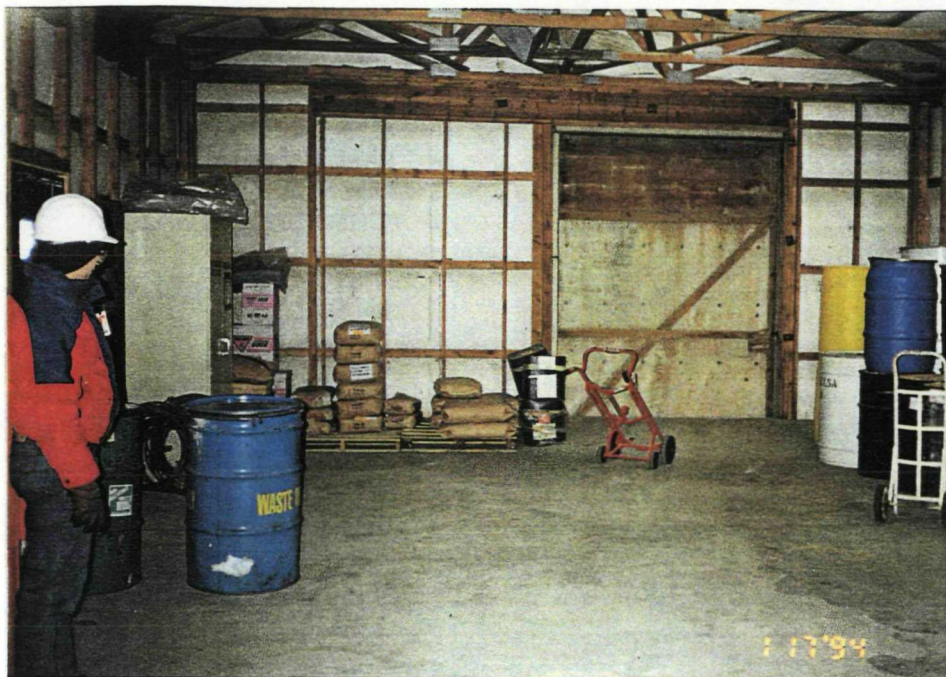
Photograph No. 2

Orientation: North

Location: SWMU 1

Date: January 17, 1994

Description: The mixed waste drum in the secondary container on the right is full, whereas the drum in secondary container on the left is about half full. Note the spill control booms surrounding the secondary containers and the absorbent pads stored on the right.



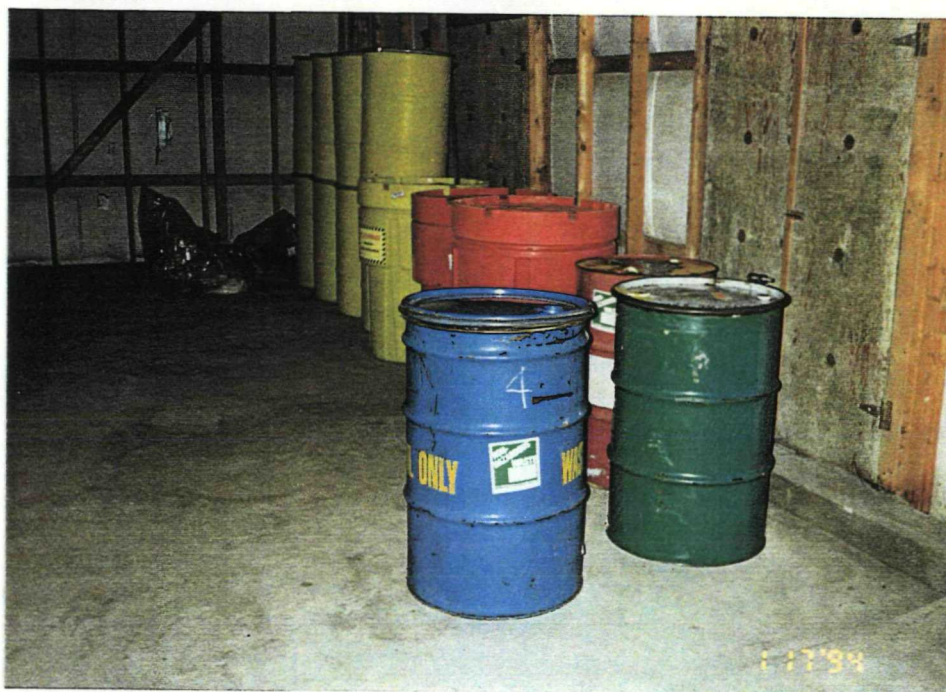
Photograph No. 3

Orientation: East

Location: SWMU 2

Date: January 17, 1994

Description: This photograph shows hazardous waste container storage area. Drums on the right are empty and three drums on the left contain nonhazardous waste. Note the spill control material in the left corner. The closet on the left also contains spill control material.



Photograph No. 4

Orientation: Northwest

Location: SWMU 2

Date: January 17, 1994

Description: The Blue, green, and red 55-gallon tanks shown in this photograph contain nonhazardous waste. The two red and one yellow overpacks should be noted. The yellow overpack contains spill control booms. The yellow, 55-gallon drums are empty.



Photograph No. 5

Orientation: Northwest

Location: SWMU 3

Date: January 17, 1994

Description: This photograph shows waste oil storage pad. Most of the drums on the pad are empty.



Photograph No. 6

Orientation: North

Location: SWMU 4

Date: January 17, 1994

Description: This photograph shows the 1,000-gallon, aboveground, used oil storage tank at level 601 of the turbine building. Note the concrete floor and the berm.



Photograph No. 7

Orientation: North

Description: This photograph shows the satellite accumulation areas (SAA) for chlorinated and nonchlorinated solvents. The middle cabinet is the secondary container for a used oil 55-gallon drum and stores spill control material.

Location: SWMU 5

Date: January 17, 1994



Photograph No. 8

Orientation: North

Description: This photograph shows the freon-contaminated oil and water SAA.

Location: SWMU 5

Date: January 17, 1994



Photograph No. 9

Orientation: West

Location: SWMU 6

Date: January 17, 1994

Description: This photograph shows the indoor oil skimmer (equipment on white frame). The oil skimmer on the right is being replaced by the one on the left. Note the used oil accumulation drum in the center.



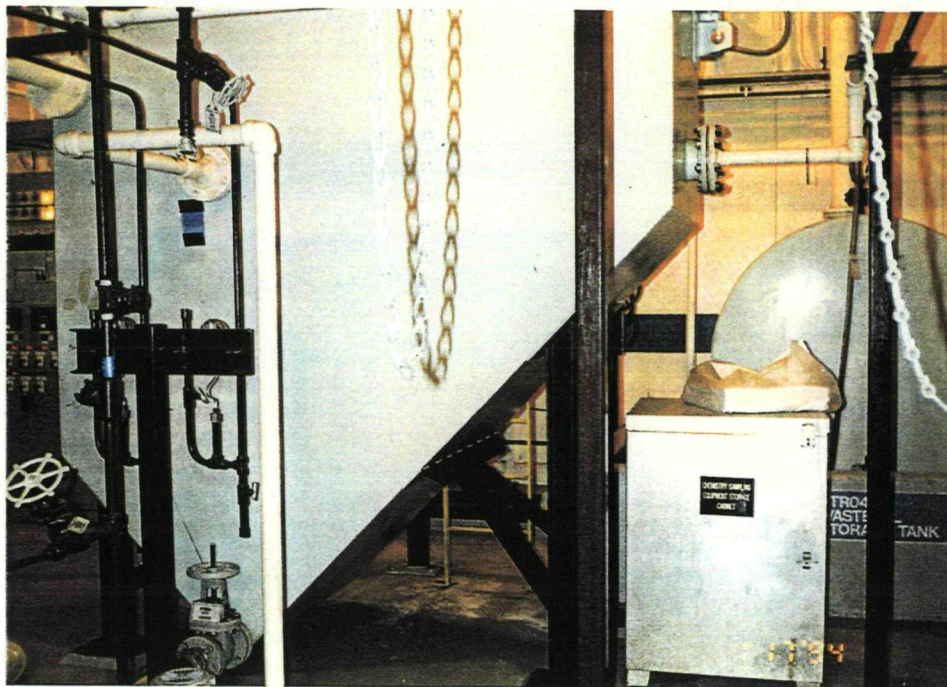
Photograph No. 10

Orientation: Northwest

Location: SWMU 7

Date: January 17, 1994

Description: This photograph shows the aboveground position of outdoor oil skimmer (underground) on the northeast of the turbine building. Red object in the middle is the oil pump.



Photograph No. 11

Orientation: Southwest

Description: This photograph shows the oil skimmer and used oil accumulation tank inside the wastewater treatment plant.

Location: SWMU 8

Date: January 17, 1994



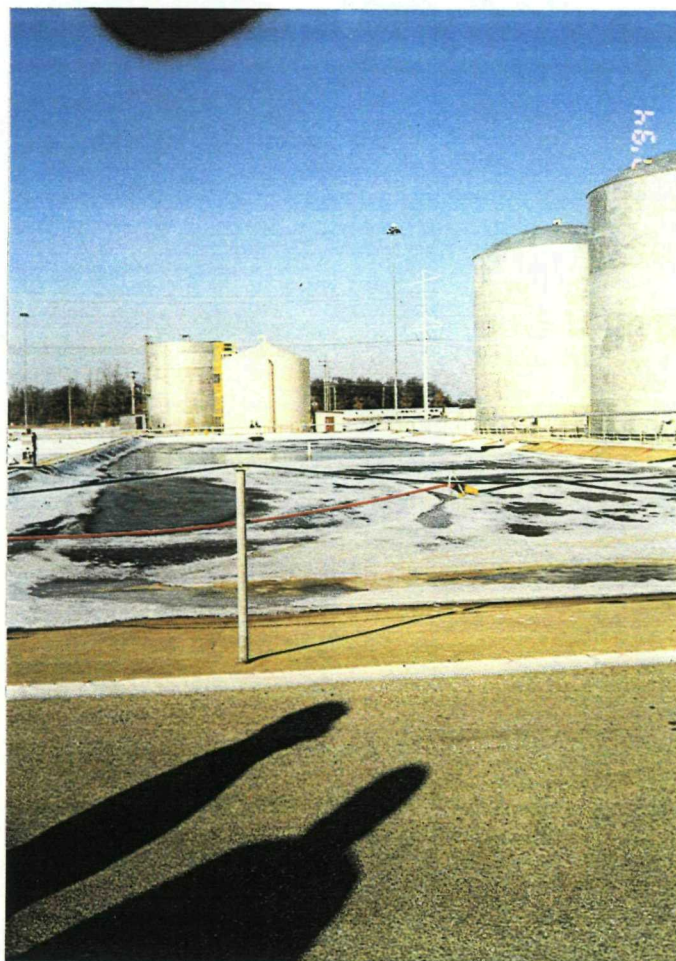
Photograph No. 12

Orientation: Northwest

Description: This photograph shows the wastewater treatment plant. The cylindrical object to the right is the pump for discharging treated water to the pipes leading to the Kankakee River.

Location: SWMU 8

Date: January 17, 1994



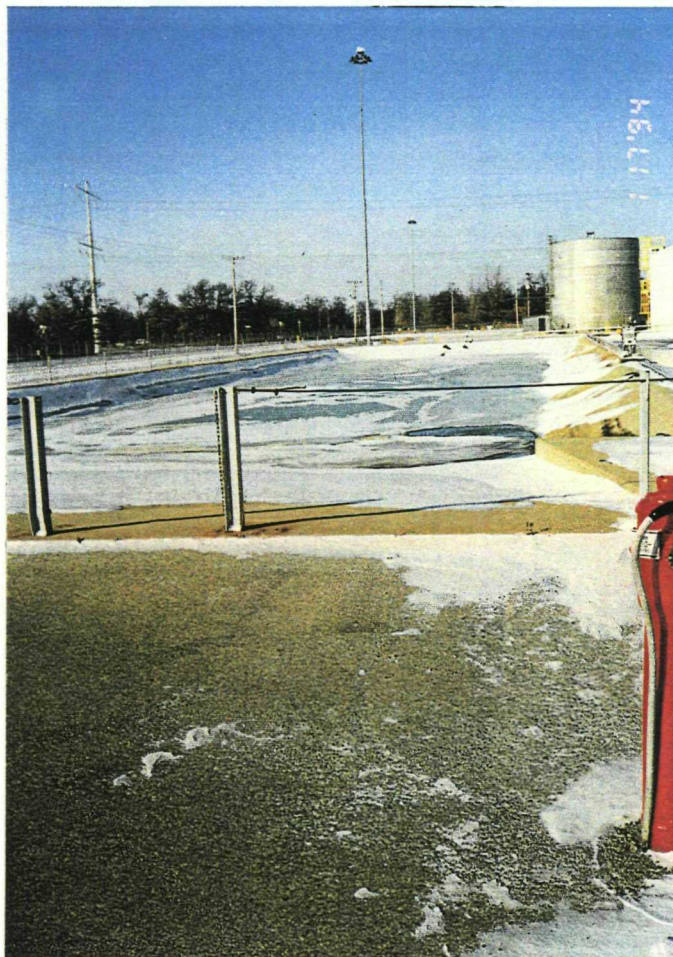
Photograph No. 13

Orientation: North

Description: This photograph shows the WWTP sludge pond.

Location: SWMU 9

Date: January 17, 1994



Photograph No. 14

Orientation: North

Description: This photograph shows the lime sludge pond.

Location: SWMU 10

Date: January 17, 1994

APPENDIX B
VISUAL SITE INSPECTION FIELD NOTES
(Nine Sheets)

- Brain Drain Project
 4/18/97 2:30 PM
 arrived at the facility
 at 2:30 PM and spent
 time in the building
 at 3:30 PM a meeting was
 held with the waste
 management team
 their own drinking water well
 facility's drinking water
 comes from the cooling water
 tank and surface runoff
 - sewage treated and discharged
 to Kankakee River
 - sewage sludge was
 disposed of on land application

- stopped in late 90 because
 of above background radio
 activity, EPA or IAEA not
 informed because radioactive
 material is controlled by NRC
 - Sludge now is dumped in
 not contained area
 If contamination is too bad
 dispose in high level waste
 water
 - generate permit for
 transport year
 - plant area surface water is
 collected in a tank separator
 and then is disposed of in Kankakee

Field Logbook No. _____ Date _____

Project No. _____

Project Name _____

At Mazan Rivers.

- Plant owns ~ 6x sections (1 mile x 1 mile each) for land application
- sludge tanks (2) hold ~ 0.5 x 10⁶ gallons each -
- oil storage tanks, pumps to an oil storage tank. Solar Environmental
- Turbine room has some oil leaks/spills from changing oil which is accumulated at satellite locations in 55-gallon drums then store it at waste oil accumulation pit.
- motor vehicle oil changes are done at a garage outside the plant property (Mazan Garage) in Mazan (~ 20 miles west)

Field Logbook No. _____ Date _____

Project No. _____

Project Name _____

demineralizer resin + charcoal gets landfilled (Land & Lakes & CDT landfill in Joliet) South Chicago

- occasional drum of grease from grease change in tandem's supporting the structure. SET environmental services takes the grease to Petrochem in Detroit.
- in addition to 3 permanent parts washer, other part washers can also be rented on as need basis.
- 3 VST's, leak testing every year passed last year, all 3 will have to be upgraded by 1998 for

- unknown reasons.
- 2 outside diesel oil storage tanks with berms (125,000 + 50,000 gallons)
 - 4 for unit 1 and 2 for unit 2
 - Also for diesel oil (~25,000 gallons for unit 1, 50,000 each for unit 2)
 - all of the above tanks are in self contained rooms in the basement. have water tight doors. Drains in these rooms go to fire and oil sump.
 - 1 turbine oil tank for each turbine. 15,000 gallons each (lub oil) in main plant building
 - elevation 401' is ground level where the fuel tanks are

- inside diesel oil tanks at ~389' elevation
- outside ones are at 401'
- 2 additional turbine oil tanks (~20,000 gallons each) for make up purposes. located at ~389'
- diesel oil tanks are fuel tanks for emergency generation of electricity.
- minor transformer oil leaks but none major
- office trash is
- recycles office paper, number of dumpsters outside
- office trash is picked by Tri County Disposal, goes probably to Kankakee landfill

Field Logbook No. _____ Date _____

Project No. _____

Project Name _____

- satellite accumulation areas:
 - 2 for H₂ waste (one for chlorinated,
* and one for non chlorinated solvents from occasional maintenance.
 - oil and preon ~~to~~ barrel
 - mercury contaminated debris from occasional accidents (equip)
 - * elemental mercury is sold to DF Goldsmith in Evanston, IL (no generation rates! ~ one 55 gallon drum per 2 year)
- waste paint barrel (one 55 gallon drum per year), SET takes the waste paint
- * Full drums go to Hazmat building

Field Logbook No. _____ Date _____

Project No. _____

Project Name _____

- 1,025 people today - all inclusive
- Trailer park coming in the NW corner of lake
- Residences on NW corner on Smiley road, ~ 1/2 mile from plant site
- 1980 estimate of population; : av density within 10 miles:
 - 87 people / sq mile
 - 210 facs / city
 - Town
 - Plants 1 IN W
 - (~~Plants~~ cal
 - libid is 1
 - 210000
 - 2 IN E
 - Dung 421

Field Logbook No. _____ Date _____

Project No. _____

Project Name _____

41 Dump of
used oil
on concrete
6 concrete
Ramp to
Entrance
10 Round new
4 not new,
Photo 3
10 in rain
4 Empty Tank
4 Lagoon
6 Sludge Lagoon
7 3 - Oil W
Separators
11 WWT
Vault W
Concrete F 1001

Field Logbook No. _____ Date _____

Project No. _____

Project Name _____

8 Discharge W
Cage to Coals
1 and
9 WWT U H
FILTER TANKS
10 Diesel Tank
11 Oil
WATER Separator
w/ storm water
outfall
2 HAZMIT AREA
3 25 X 45 ON
Concrete Loading
Dock on Both
SIDES OR
30 by 50 by 10
1 - Waste FURQUEL

Field Logbook No. _____ Date _____

Project No. _____

Project Name _____

Cathy M. Wall
2/17/94

110

Field Logbook No. _____ Date _____

Project No. _____

Project Name _____

Cathy M. Wall
2/17/94

111

Field Logbook No. _____ Date _____

Project No. _____

Project Name _____

1 WASTE GREASE
1 Charcoal

USE about
300 gallons of
hydraulic oil
yearly
use as a hydraulic
control system

Empty drum
and overpack
used as
oil or paint
or stock
storage
3 Overpack

112

Field Logbook No. _____ Date _____

Project No. _____

Project Name _____

Spill clean
equipment
in 5
at the garden
Berne area

14 MIXED WASTE STORAGE
15 " " " "
35 by 50 x 9
Hydraulic Flocc
2 drums in
Secondary Containment
Storage System

From 113 (FOU)
Shed from
a Tool Cleaning
machine

113

Field Logbook No. _____ Date _____

Project No. _____

Project Name _____

On Plastic
Liner
16 Diesel
Storage
Tank - Emergency
North
17 1000 - GALLON
WASTE OIL
TANK
ON CONCRETE
IN DIKE D
AREA
18 W -
Turbine Oil
Reservoir

Field Logbook No. _____ Date _____

Project No. _____

Project Name _____

19 W/
Oil/water Spreader
Oil Accumulation
area - Oil is in
55 - Gallon drum
20 1000 SAA
Chlorinated
Solvent
FREQUEL - NH
Non-chlorinated
Solvent
21 FROTH
WASTE OIL
SOLVENT SAA
22 N Storage
Drum kept
before 1990

Field Logbook No. _____ Date _____

Project No. _____

Project Name _____

NOT Radiocarbon
23NE
Final Lift
Station
3:40 TOUR
OVER
Photo 24
SLUDGE
3:45 TO 4:15
DISCUSSED ADDITIONAL
INFORMATION -
DIESEL RELEASE
OUTBRIEF
4:30 pm
PRC OFF - SITE

116

Field Logbook No. _____ Date _____

Project No. _____

Project Name _____

~~1/17/94~~

117